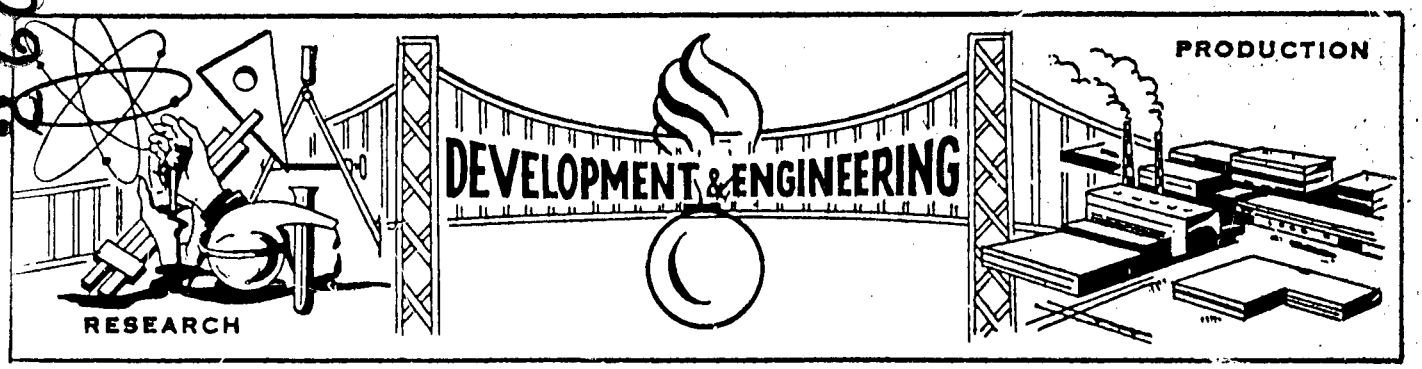
AD 260 405



TECHNICAL REPORT
DR-TR: 4-61

EVALUATION OF STORAGE CHARACTERISTICS OF PA-101 AND PA-101D PRIMER COMPOSITIONS

BY
WILLIAM F. McGARRY
EDMUND P. VAIL

COPY NO. 66 OF 100

JULY 1961

AMMUNITION GROUP
PICATINNY ARSENAL - DOVER, NEW JERSEY

TECHNICAL REPORT

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PROJECT NO: 252.9501.2600.311

REPORT NO: DR-TR: 4-61

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SECTION 1

INTRODUCTION

1. This work was conducted to determine the storage characteristics of PA-101 and PA-101D Primer Compositions.

2. PA-101 Primer Composition (53/22/10/5/10 basic lead styphnate/barium nitrate/antimony sulfide/tetracene/aluminum) was developed as a result of a request for a primer composition equal to or better than the one used to ignite the non-gaseous delay composition in the M42 Primer. PA-101 Primer Composition was found to have the characteristics that consistently initiate delay compositions in an obturated system--namely, low impulse and gas volume values (Reference 1). It was felt that the optimum loading pressure and storage characteristics of the composition should be determined before recommending it for standardization.

3. It was thought that the aluminum in the PA-101 Primer Composition might react with the oxidizers in the mixture during storage; therefore, a second primer composition designated PA-101D--was prepared using dichromated aluminum to prevent such possible reaction. The optimum consolidation pressure and charge weight for both the PA-101 and PA-101D Primer Compositions were established (Reference 2).

4. The work on PA-101 Primer Composition was to be continued as soon as funds were available. Equal quantities of M42 Primer metal parts were loaded with either Composition PA-101 or with the composition containing the dichromated aluminum. Each primer contained 20 milligrams of primer composition consolidated at 6,000 psi. Staircase sensitivity and gas volume-impulse tests were conducted at start of the program and at

regular intervals during the year while the primers were undergoing elevated and ambient temperature storage. The burning times of M204A2 Hand Grenade Fuzes assembled with the M42 Primers loaded with PA-101 and PA-101D Primer Compositions were determined before and after surveillance storage.

SECTION II

SUMMARY

1. Primer compositions PA-101 and PA-101D proved to have low impulse and gas volume values. These are two characteristics of a primer composition that consistently initiate delay compositions in an obturated system.

2. Equal quantities of M42 Primer metal parts were loaded with either Composition PA-101 or PA-101D and subjected to one year's storage at either ambient or elevated temperatures. Each primer contained 20 milligrams of primer composition consolidated at 6,000 psi. Staircase sensitivity and gas volume impulse tests were conducted at inception of the program and at regular intervals during the year, paralleling the approach with previously tested M42 Primers containing the standard composition.

3. Burning times of both primers (Composition PA-101 and PA-101D) assembled in M204A2 Hand Grenade Fuzes were determined before and after surveillance storage.

SECTION III

CONCLUSIONS

PA-101 and PA-101D Primer Compositions loaded in M42 Primer metal parts are stable when subjected to storage at extreme temperatures over a period as long as one year. M42 Primers when loaded with 20 milligrams of either PA-101 or PA-101D Primer Composition and consolidated at 6,000 psi will consistently initiate Type II zirconium-nickel alloy delay compositions. The PA-101D dichromated composition appears to be equivalent to plain PA-101 and in addition has better flow properties.

SECTION IV

RECOMMENDATION

PA-101D Primer Composition should be used as the standard primer composition for initiating Type II Zirconium-nickel Alloy Delay Composition.

SECTION V

STUDY

1. The materials used in the work covered by this report include:

Basic lead styphnate, 90% min. through No. 325 mesh--U.S. Standard Sieves--(commercial).

Barium nitrate, Class A, 99% min. through No. 70 mesh, PA-PD-253, 4/1/53.

Antimony sulfide, Class E, PA-PD-494, 1/15/54.

Tetracene, 50% min. through No. 325 mesh.

Aluminum, Type II, 200-325 nominal mesh size, MIL-P-14067, 5/16/55.

Composition, Delay, Type II, MIL-C-13739 (Ord), 11/2/54.

Lacquer, Egyptian, No. 4707, Commercial.

2. The PA-101 Primer Composition was prepared by blending 53% basic lead styphnate, 22% barium nitrate, 10% antimony sulfide, 5% tetracene and 10% aluminum. The PA-101D Primer Composition was prepared the same way except that the aluminum was dichromated before being blended with the other ingredients. The method used for dichromating the aluminum was essentially Dow Chemical Treatment No. 7 detailed on page 50 of Reference 3.

3. Equal quantities of M42 Primers containing PA-101 and PA-101D primer compositions were loaded by pressing 20 milligrams of dry primer composition into each primer cup at 6,000 psi. (The dichromated composition flowed more freely of the two compositions and therefore was easier to load). A drop of Egyptian Lacquer was placed on the charge followed by a foil paper disc of .005 inch thickness and then an anvil was pressed in place. Drawing 74-2-66 (Page C-1) was used as a guide. The primers were dried for 24 hours at a temperature of 55°C.

4. Two groups of 150 each of the M204A2 Hand Grenade Fuzes were assembled using M42 primers containing PA-101 Primer Composition in one group and primers containing PA-101D Primer Composition in the other group. The fuzes were assembled in accordance with Drawing F82-1-87 (Page C-2) except that in place of the detonator assembly (pc. mk 82-1-87E), the C-58 Non-electric Blasting Cup was used. Fifty fuzes from each of these groups were conditioned at -65°F, ambient temperature, and at 160°F for 16 hours before testing for burning times.

5. Each M204A2 Hand Grenade Fuze was clamped in the test fixture before functioning so that the delay charge column would not be damaged by dropping the fuze--the chief concern being the ability of the primer to initiate Type II Delay Composition With the exception of clamping the fuze in the test fixture, the fuze functioning tests were conducted as outlined in paragraph 4.5 of Reference 6. The standard deviations in burning time for the PA-101 Composition were 0.10, 0.15, and 0.15 second at -65°F, ambient temperature, and 160°F respectively; those for the PA-101D Composition were 0.15, 0.13, and 0.12 second respectively. These tests were repeated using M42 Primers that had been stored for one year at 160°F and at ambient temperature. The detailed results of these tests are in Table I.

6. Frequency distribution graphs of the burning times recorded in these tests are in Figures 1-3. The same data is presented in Figure 4 to smaller scale, but on one page for easier comparison.

7. One hundred M42 Primers from each group were tested at the start of this program to determine the 50% functioning height and 50 M42 Primers from each group were used to determine the impulse and gas volume.

8. The staircase sensitivity test was performed by starting at an estimated 50% functioning height, using available sensitivity data as a guide. The step interval used was one inch. The results were evaluated in accordance with the procedure outlined in Reference 4.

9. The impulse and gas volume tests were run on the standard Picatinny Arsenal Impulse and Gas Volume Apparatus. The procedure followed was described in paragraph F7 of Reference 5 except that a value of 48 inch-ounces was used instead of the specified 56 inch-ounces. For both the sensitivity tests and the gas-volume impulse tests, the primers were pressed into the test adapters using a dead load of 200 pounds.

10. Primers loaded with the PA-101 Primer Composition produced an impulse and gas volume of 1.90 inches and 0.35 millimeters respectively--compared to 1.74 inches and 0.34 millimeters for similar primers using the PA-101D Primer Composition. Equal quantities of the remaining two groups of M42 Primers were placed in storage at 160°F and at ambient temperature

11. The sensitivity test and the impulse and gas volume tests were repeated with both groups of primers that were subjected to high temperature storage after one, two, four, six and twelve-month storage and with both groups after two, six and twelve-month storage at ambient temperature. The detailed test results are in Table 2.

12. Comparison of test results (Table 1 and 2) shows little difference in the characteristics of plain and dichromated PA-101 Primer Composition. Both compositions proved stable when exposed to extreme temperatures over a period of time. The slight difference seemed to be in favor of the dichromated composition. This composition was easier to load because it

flowed more freely than the plain composition. The weight of the charge and the consolidation pressure were determined in earlier work with these compositions. The M204A2 Hand Grenade Fuzes were clamped in the test device and functioned to prevent shock to the delay charge column and fuze metal parts which occurs when fuzes are dropped on steel plates. Type II Delay Composition was used since it is more difficult to ignite than the Type I Delay Composition which had been used in earlier tests of PA-101 primer composition.

REFERENCES

1. T. W. Stevens and K. G. Sheffield, PA-101 Primer Mixture for Initiating Delay Compositions, Explosives Development Section Report No. 10, April 1957.

2. K. G. Sheffield and W. F. McGarry, PA-101 and PA-101-D Primer Mixtures, Explosives Development Section Report No. 24, March 1958.

3. Magnesium Finishing, Magnesium Department, The Dow Chemical Company, Midland, Michigan. 1955.

4. Statistical Analysis for a New Procedure in Sensitivity Experiments, AMP Report No. 101.1R, July 1944.

5. Primer, Percussion, M29, Specification MIL-P-2496, 9 October 1950 with ANR 21266-S, 18 August 1953.

6. Fuzes, Grenade, Hand, M204A2, M206A2, and Practice, M205A2, Loading, Assembling and Packing, Specification OAC-PD-4 (Rev 3), 27 March 1957.

APPENDICES

APPENDIX A

DATA TABLES

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DATA TABLES

TABLE 1

BURNING TIMES OF M204A2 HAND GRENADE FUZES

PA-101 PRIMER MIX									Storage Time, Months	PA-101-D PRIMER MIX								
0			12 @ AME. T.			12 @ 160°F				0			12 @ AMB. T.			12 @ 160°F		
-65°F	AMB	160°F	-65°F	AMB	160°F	-65°F	AMB	160°F	Conditioning Temperatures	-65°F	AMB	160°F	-65°F	AMB	160°F	-65°F	AMB	160°F
50	50	50	50	50	50	50	50	50	Number Tested	50	50	50	50	50	50	50	50	50
4.89	4.75	4.55	4.60	4.60	4.50	4.70	4.57	4.41	Average Burning Time, sec	4.86	4.70	4.64	4.61	4.60	4.50	4.66	4.57	4.48
0.10	0.15	0.15	0.08	0.09	0.08	0.09	0.09	0.09	Standard Deviation, sec	0.15	0.13	0.12	0.06	0.07	0.11	0.06	0.09	0.10
5.15	5.20	4.86	4.84	4.95	4.70	4.89	4.81	4.62	Maximum, sec	5.52	4.94	4.91	4.75	4.76	4.84	4.79	4.74	4.75
4.71	4.45	4.35	4.51	4.39	4.34	4.45	4.40	4.27	Minimum, sec	4.57	4.42	4.45	4.51	4.49	4.32	4.56	4.44	4.29
0	0	0	0	0	0	1	0	0	Number of Duds	0	0	0	0	0	0	0	0	0

TABLE 2

SENSITIVITY, IMPULSE AND GAS VOLUME TESTS OF M42 PRIMERS

PA-101 PRIMER MIX (a)										PA-101-D PRIMER MIX (b)								
0	1	2	2	4	6	6	12	12	Storage, Time, Months	0	1	2	2	4	6	6	12	12
	160°F	AMB	160°F	160°F	AMB	160°F	AMB	160°F	Storage Temperatures		160°F	AMB	160°F	160°F	AMB	160°F	AMB	160°F
									Staircase Test (c)									
100	100	100	100	100	100	100	100	100	Number Tested	100	100	100	100	98	100	100	100	100
2.17	2.85	2.17	1.78	1.82	2.10	2.14	2.28	1.71	Sensitivity, 50% Height Inch	2.76	2.01	2.34	1.35	1.96	2.28	2.22	2.09	2.31
0.63	0.57	0.54	0.37	0.43	0.48	0.44	0.64	0.40	Standard Deviation, Inch	0.54	0.40	0.51	0.43	0.58	0.39	0.56	0.55	0.63
4.06	4.56	3.79	2.89	3.[illegible]	3.54	3.46	4.20	2.91	All Fire Level, Inch	4.38	3.21	3.87	3.14	3.70	3.45	3.90	3.74	4.20
0.28	1.14	0.55	0.67	0.53	0.66	0.82	0.36	0.51	No Fire Level, Inch	1.14	0.81	0.81	0.56	0.22	0.11	0.54	0.44	0.42
									Impulse Test (d)									
50	48	48	49	50	50	50	50	50	Number Tested	50	50	50	50	50	50	49	50	50
1.90	2.57	2.36	2.18	2.73	2.51	2.63	2.05	1.88	Average Inches	1.74	1.51	1.80	1.66	1.72	1.90	1.47	1.67	1.36
0.11	0.15	0.20	0.45	0.35	0.41	0.23	0.35	0.40	Standard Deviation, Inch	0.19	0.12	0.36	0.32	0.52	0.39	0.30	0.33	0.19
2.70	3.10	2.70	3.30	3.90	3.20	3.20	2.70	2.50	Maximum, Inch	2.20	2.20	2.40	2.30	3.50	3.50	2.10	2.30	1.80
1.30	2.30	1.60	1.20	1.90	1.40	2.30	1.50	1.30	Minimum, Inch	1.40	1.20	1.20	1.20	1.20	1.10	1.10	1.10	0.90
									Gas Volume Test									
50	48	48	49	50	50	50	50	50	Number Tested	50	50	50	50	50	50	49	50	50
0.35	0.36	0.34	0.36	0.38	0.34	0.37	0.37	0.32	Average, Milliliters	0.34	0.29	0.31	0.34	0.32	0.36	0.27	0.30	0.28
0.03	0.03	0.03	0.05	0.06	0.04	0.04	0.06	0.05	Standard Deviation, Milliliters	0.04	0.04	0.04	0.04	0.06	0.07	0.04	0.04	0.04
0.40	0.40	0.40	0.40	0.65	0.40	0.45	0.50	0.40	Maximum, Milliliters	0.40	0.35	0.40	0.40	0.60	0.55	0.35	0.40	0.40
0.30	0.30	0.30	0.30	0.30	0.25	0.30	0.30	0.20	Minimum, Milliliters	0.30	0.25	0.10	0.30	0.25	0.25	0.20	0.20	0.20

(a) 53% basic lead styphnate, 22% barium nitrate, 10% antimony sulfide, 5% tetracene, 10% aluminum.

(b) Same composition as PA101, but aluminum was dichromated prior to blending of the mix.

(c) 1.94-oz ball and 1-inch increments used.

(d) 8-oz ball dropped 6 inches.

APPENDIX B

FREQUENCY DISTRIBUTION GRAPHS

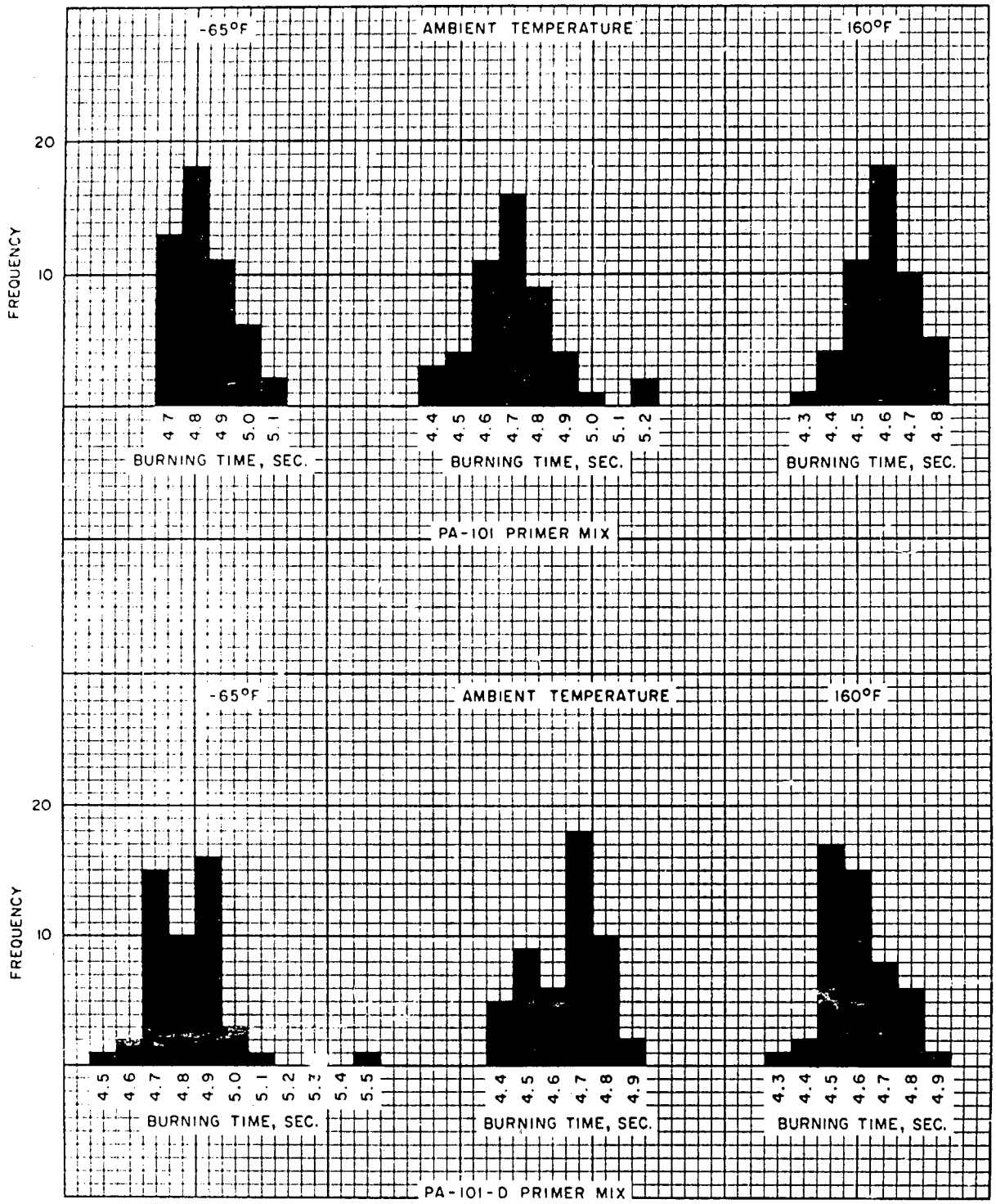


Figure 1. Frequency Distribution of Burning Time of M204A2 Hand Grenade Fuzes with Indicated Primer Mix. Primers Tested At Inception of Program

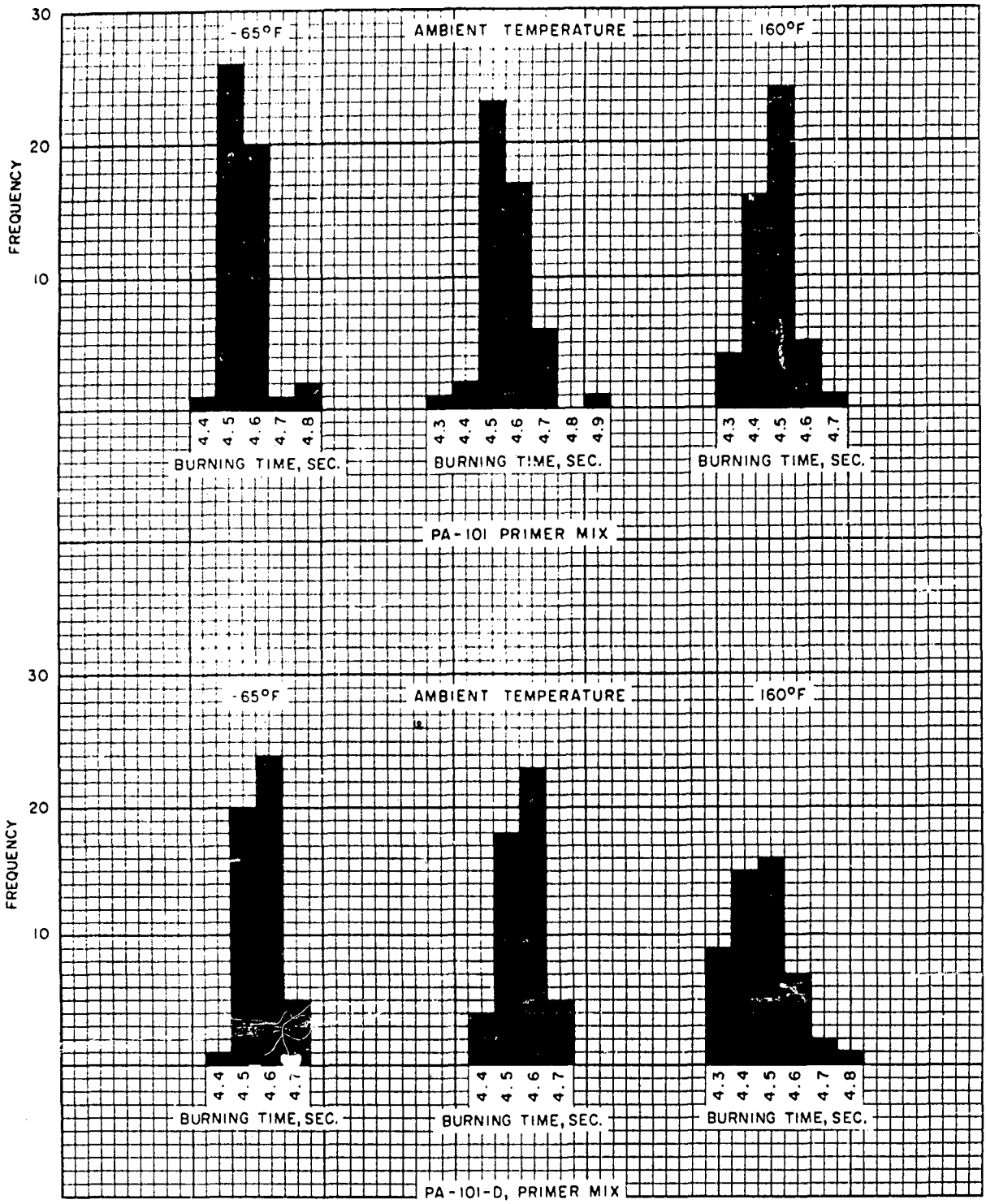


Figure 2. Frequency Distribution of Burning Time of M204A2 Hand Grenade Fuzes with Indicated Primer Mix. Primers Stored 12 Months At Ambient Temperature Before Testing

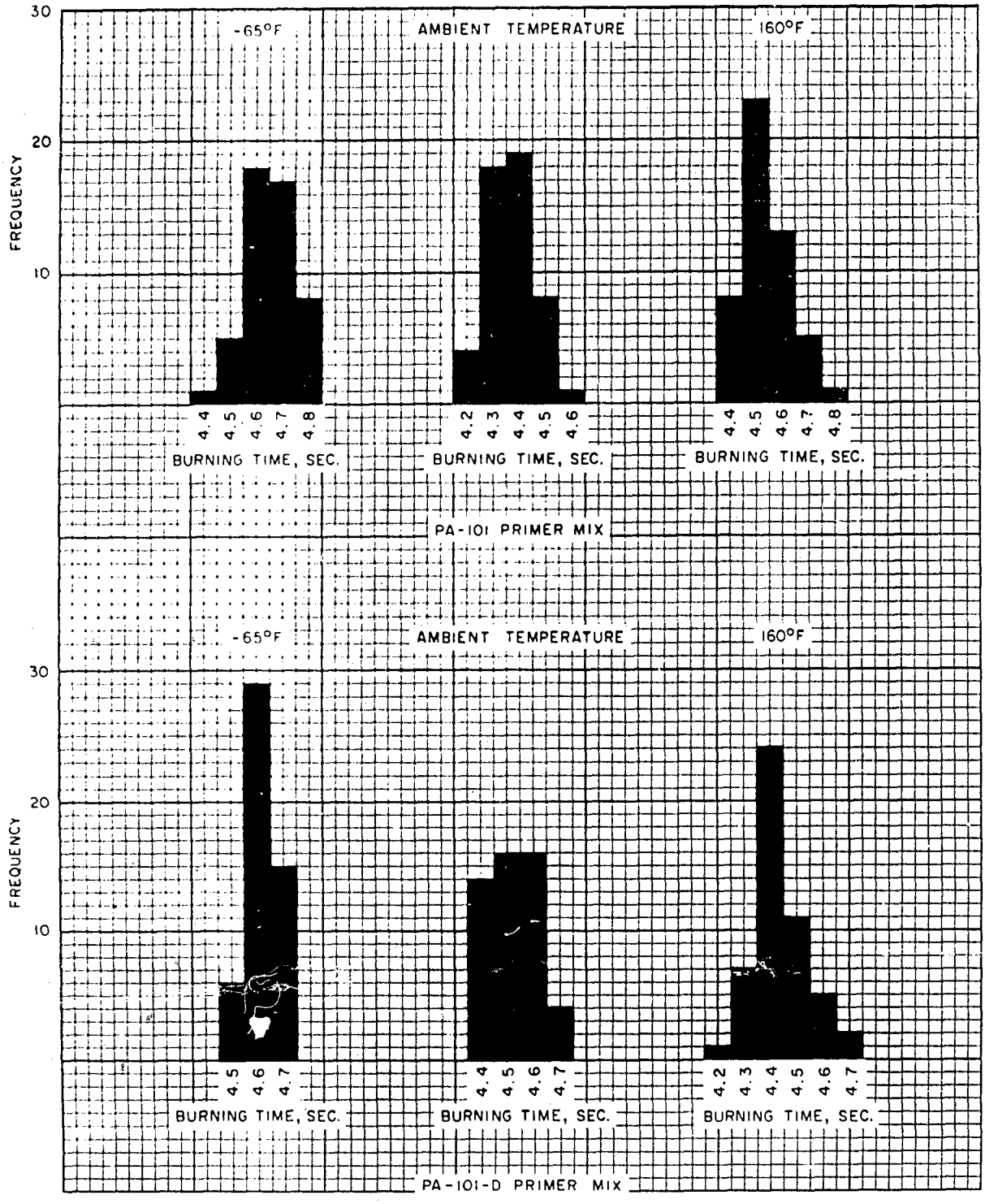


Figure 3. Frequency Distribution of Burning Time of M204A2 Hand Grenade Fuzes with Indicated Primer Mix. Primers Stored 12 Months at 160°F Before Testing

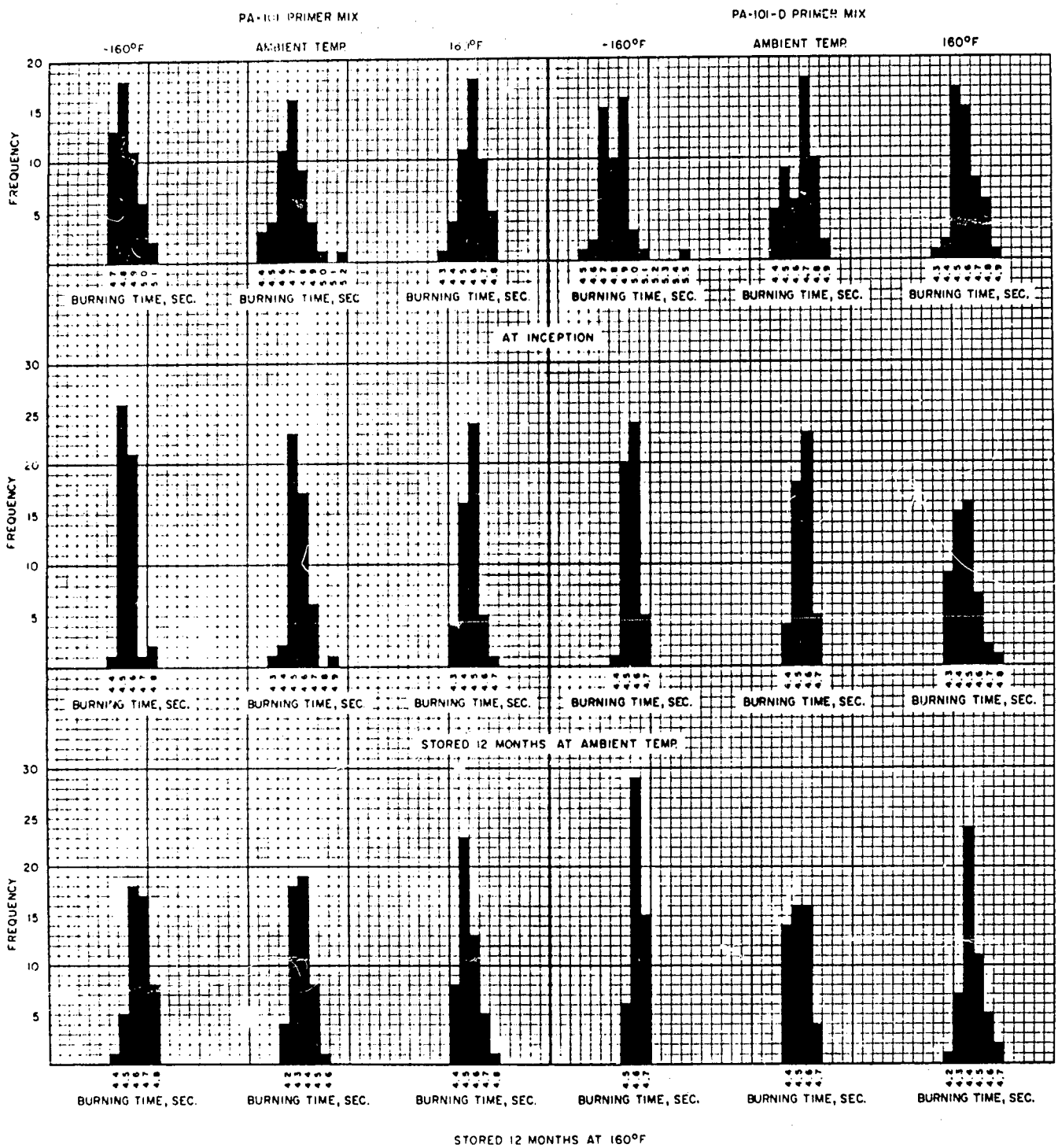


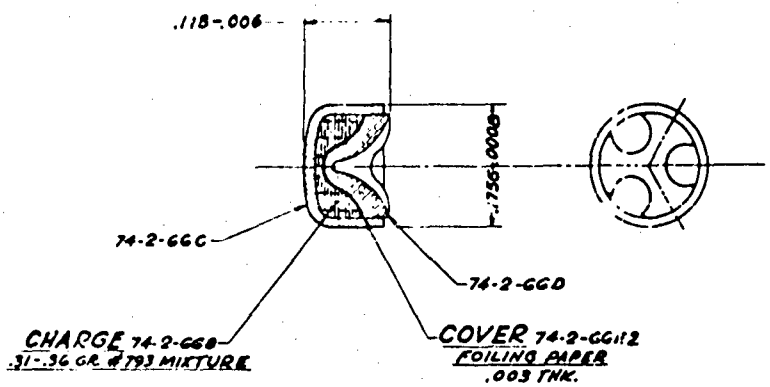
Figure 4. Frequency Distribution of Burning Time of M204A2 Hand Grenade Fuze with Indicated Primer Mix

APPENDIX C

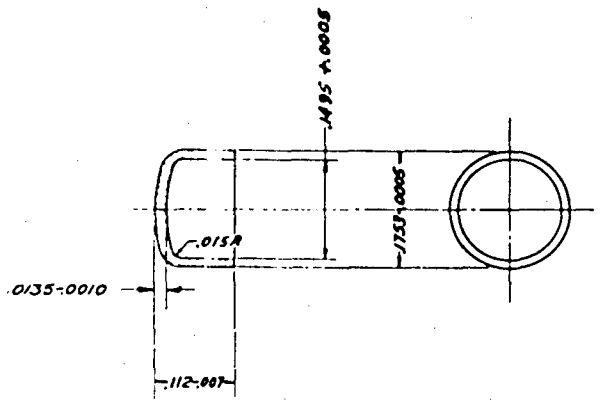
DRAWINGS

HEAT TREATMENT AND FINAL FINISH

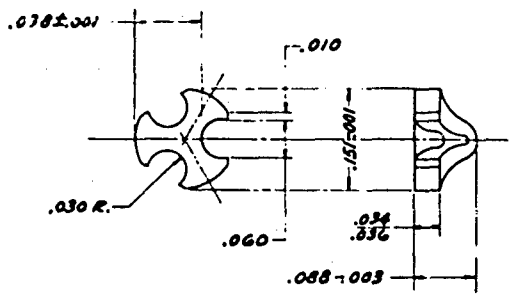
LINE NO.	NAME C
1	ASSEMBLY
2	ANVIL
3	CHARGE
4	COVER
5	CUP
6	
7	
8	



ASSEMBLY 74-2-GGA2
10
1



CUP 74-2-GGC2
ALLOY 90-10 GILDING METAL
.0130-.0135 TH.
WT. 180 ± .05 GR.
40
1



ANVIL 74-2-GGD
CARTRIDGE BRASS STRIP
CLASS "A" LIGHT ANNEAL
40
1

NOTE:- FORMING AND BLANKING PUNCH HAS .010 R. ON POINT TO MAINTAIN AS SHARP A POINT AS POSSIBLE ON ANVIL.

REMOVE ALL BURRS

LINE NO.	
1	AM
2	ALC
3	
4	
5	
6	BRA
7	
8	GIL
9	
10	
11	
12	MET
13	
14	PAP
15	
16	PRI
17	
18	
19	SHE
20	

(a) VA
5
1½
(b) PRI
(c) ALT
SPE

THE
IS RE
TO IN

1

LIST OF PARTS

LINE NO.	NAME OF PART	NUMBER REQD. PER COMPONENT	PIECE-MARK	MATERIAL: SIZE OR FORM	MATERIAL: KIND	MATERIAL: GRADE	MATERIAL: SPEC. NUMBER	APPROXIMATE UNIT WEIGHT (GRAINS)	APPROX. GROSS WT. OF RAW STOCK PER 1000 ASSYS.	REMARKS
1	ASSEMBLY		74-2-66A				AXS-1288			
2	ANVIL	1	74-2-66D	STRIP	CARTRIDGE BRASS	CLASS "A"	57-172-1	.482.06		
3	CHARGE	1	74-2-66B							(b)
4	COVER	1	74-2-66E	SHEET	FOILING PAPER		50-11-24			(c)
5	CUP	1	74-2-66C		GILDING METAL		57-171-1	1.982.06		
6					ALCOHOL, ETHYL	2	4-1018			
7					VARNISH, SHELLAC, SPECIAL					(a)
8										

PHYSICAL PROPERTIES: YP, TS, EL %, RED, BR, ROCK

(a) VARNISH, SHELLAC, SPECIAL.
5 PINTS OF ALCOHOL, GRADE 2 --SPEC. 4-1018
1½ POUNDS OF ORANGE SHELLAC, TYPE "B" -- SPEC. TT-S-271

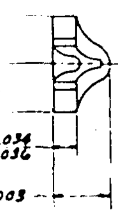
(b) PRIMER MIX: WESTERN CARTRIDGE CO'S. #793 OR EQUAL.
(c) ALTERNATIVE:- "IMANILA, THIRTY POUND BASIS; IMPREGNATE WITH 5 PERCENT SHELLAC SOLUTION AND DRY.

LINE NO.	LIST OF SPECIFICATIONS	* SPEC. NUMBER	REQUIRED BY
1	AMMUNITION, EXCEPT SMALL ARMS AMM., GENERAL SPEC. FOR	50-0-1	DRG. 74-2-66
2	ALCOHOL, ETHYL	4-1018	DRG. 74-2-66
3			
4			
5			
6	BRASS, CARTRIDGE, SHEET AND STRIP	57-172-1	DRG. 74-2-66
7			
8	GILDING METAL, SHEET, STRIP AND COIL	57-171-1	DRG. 74-2-66
9			
10			
11			
12	METALS; GENERAL SPECIFICATIONS FOR INSPECTION OF	QQ-M-151	DRG. 74-2-66
13			
14	PAPER, FOILING	50-11-24	DRG. 74-2-66
15			
16	PRIMER, M42	AXS-1288	DRG. 74-2-66
17			
18			
19	SHELLAC, ORANGE	TT-S-271	DRG. 74-2-66
20			

FOR USE IN FUZE, GRENADE, HAND, T2E1 AND FUZE, GRENADE, HAND, T18.

STANDARDIZED BY OCM 26391 JAN. 18, 1945

*THE SPECIFICATION NUMBERS SHOWN ARE BASIC NUMBERS ONLY. WHEN A SPECIFICATION IS RE[illegible]SED, A LETTER IS AFFIXED TO ITS BASIC NUMBER. SPECIFICATIONS REFERRED TO IN [illegible]HESE SPECIFICATIONS AND NOT LISTED HEREON SHALL NOT APPLY.



.034
.036
.003

-2-66D
RASS STRIP
HT ANNEAL

ING PUNCH HAS
MAINTAIN AS
OSSIBLE ON ANVIL.

RRS

PRIMER M42
ASSEMBLY AND DETAILS

MARCH 29, 1944

CLASS	DIVISION	DRAWING	FILE
74	2	66	

REVISIONS
1 6-3-44
2 12-11-44
3 7-5-45

TOLERANCE ON DIMENSIONS NOT OTHERWISE SPECIFIED
DECIMAL ±
FRACTIONAL ±
ANGULAR ±

E.R.G. E.R.G.
E.B.

DRG. PERTAINS TO

SUBMITTED: M. Mc[illegible] PRINC. ENG. ORD. DEPT. U.S.A.
EXAMINED: H. H. Holter COL. ORD. DEPT. U.S.A.
APPROVED BY ORDER OF THE CHIEF OF ORDNANCE: G. A. Lr[illegible] COL. ORD. DEPT. U.S.A.

D

ORDNANCE DEPT., U.S.A.

RESTRICTED

Figure 1

2

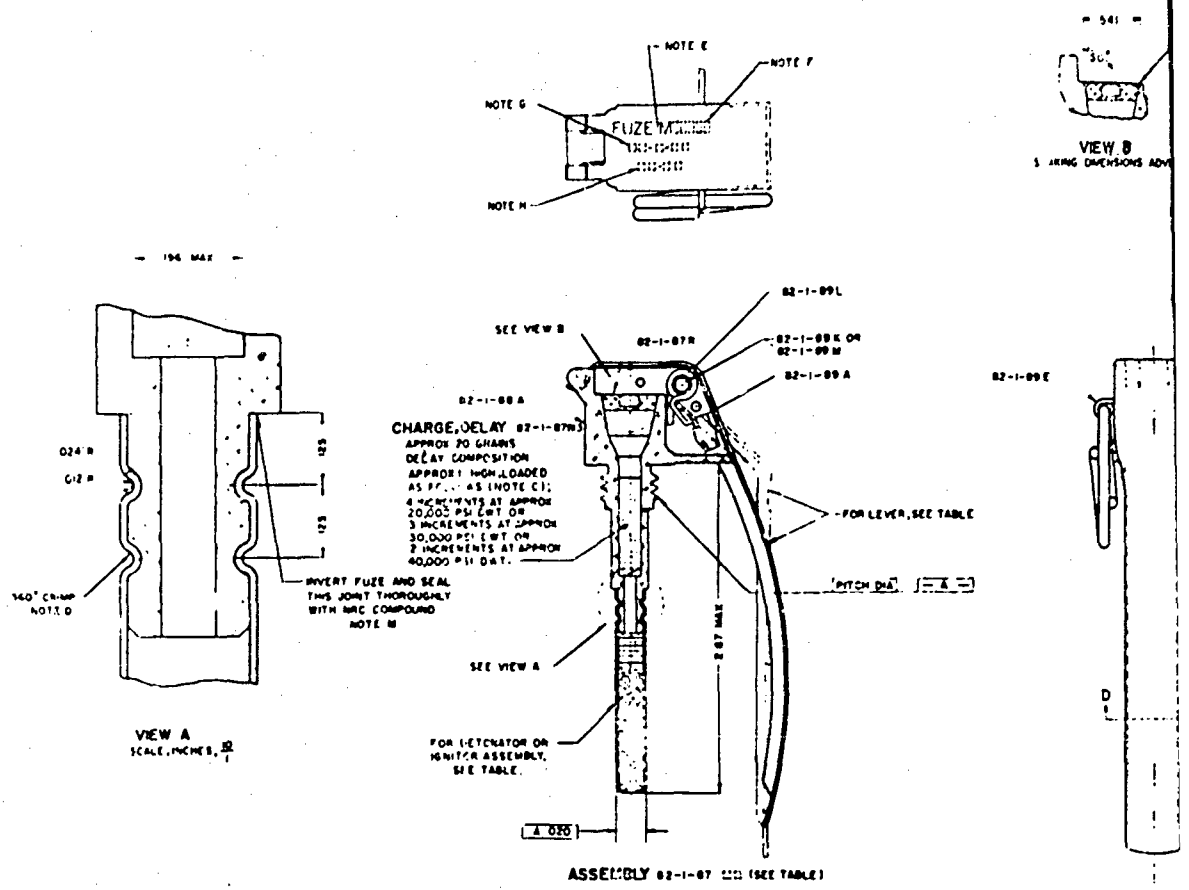


TABLE			
DESIGNATION	ASSEMBLY PIECE MARK	LEVER PIECE MARK	DETONATOR OR IGNITER ASSEMBLY PIECE MARK
FUZE, GREN, HAND, M204 A2	82-I-87 A2	82-I-90A	82-I-87E OR N
FUZE, GREN, HAND, PRAC, M205A2	82-I-87 H2	82-I-90C	82-I-87L
FUZE, GREN, HAND, M206 A2	82-I-87 K2	82-I-90B	82-I-87E OR N

NOTES
A - ASSEMBLE SPRING WITH ANGULAR SPRING DISPLACEMENT OF APPROX 45°
C - DELAY COMPOSITION MAY BE PELLETED BEFORE BEING RECONSOLIDATED INTO BODY, PROVIDED EACH PELLET IS RECONSOLIDATED SINGLY IN THE BODY AT SPECIFIED PRESSURE
D - 360° CRIMP PRODUCED BY DUPONT SUPERIOR CRIMPER, SERIAL NO 68, E I DUPONT DE NEMOURS CO, OR APPROVED SUBSTANTIAL EQUAL, MAY BE USED.
E - STAMP AS INDICATED WITH LETTERS AND FIGURES 3/32 HIGH AND .01 DEEP. NOTE K
F - DESIGNATION OF FUZE (SEE TABLE)
G - LOADERS LOT NUMBER
H - DATE (MONTH AND YEAR) LOADED
K - ALTERNATIVE - MARK WITH BLACK NO 3725 STENCIL INK
L - SPREAD SAFETY PIN (45° ADVISORY) TO GIVE RESISTANCE TO WITHDRAWAL, 10 LB MIN, 30 LB MAX, BOTH PRONGS TO BE SPREAD APPROX EQUAL.
M - USE RED NRC COMPOUND ON ASSEMBLY OF M204A2 AND M206A2 FUZES
USE GREEN NRC COMPOUND ON ASSEMBLY OF M205 A2 FUZE.
N - STAKE BODY TO PRIMER HOLDER WITH SIX EQUALLY SPACED STAKES, .06 LONG (SEE VIEW B)
AFTER STAKING, THE TOP OF PRIMER HOLDER ASSEMBLY, PCMR 82-I-87 R SHALL BE FLUSH OR .020 MAX BELOW FLUSH ADVISORY. - THE ASSEMBLY OF THE BODY AND THE PRIMER HOLDER ASSEMBLY SHOULD BE CAPABLE OF WITHSTANDING AN INTERNAL AIR PRESSURE OF 200 PSI FOR 10 SECONDS WITHOUT LEAKAGE.
P - COAT JOINT AND STAKE MARKS WITH PHENOL-FORMALDEHYDE VARNISH, TYPE III.
R - SECURE BY CRIMPING THROUGH 360° AND SEAL WITH TYPE III PHENOLFORMALDEHYDE VARNISH.
S - COAT ENTIRE OUTSIDE SURFACE WITH SHELLAC AND ANILINE DYE, TYPE I OR II, AND ALLOW TO DRY BEFORE LOADING DYE MAY BE APPLIED TO EXTERIOR SURFACE.
T - USE OF EITHER A, GRAPHITE OR CALCIUM STEARATE OR A COMBINATION THEREOF PERMITTED AS BINDER LUBRICANT
U - USE OF DUPONOL G, A PRODUCT OF E I DUPONT DE NEMOURS & CO OF WILMINGTON, DEL, OR APPROVED SUBSTANTIAL EQUAL, PERMITTED AS WETTING AGENT.
W - USE OF COARSER GRANULATION PERMITTED FOR AUTOMATIC LOADING, ACCUMULATED ON U S STANDARD SIEVE # 16 MESH-0% ACCUMULATED ON # 70 MESH-85% MIN PASS THROUGH #100 MESH-5% MAX

SUPERSEDES 82-I-87 WITH CHANGE MAY 3, 1954

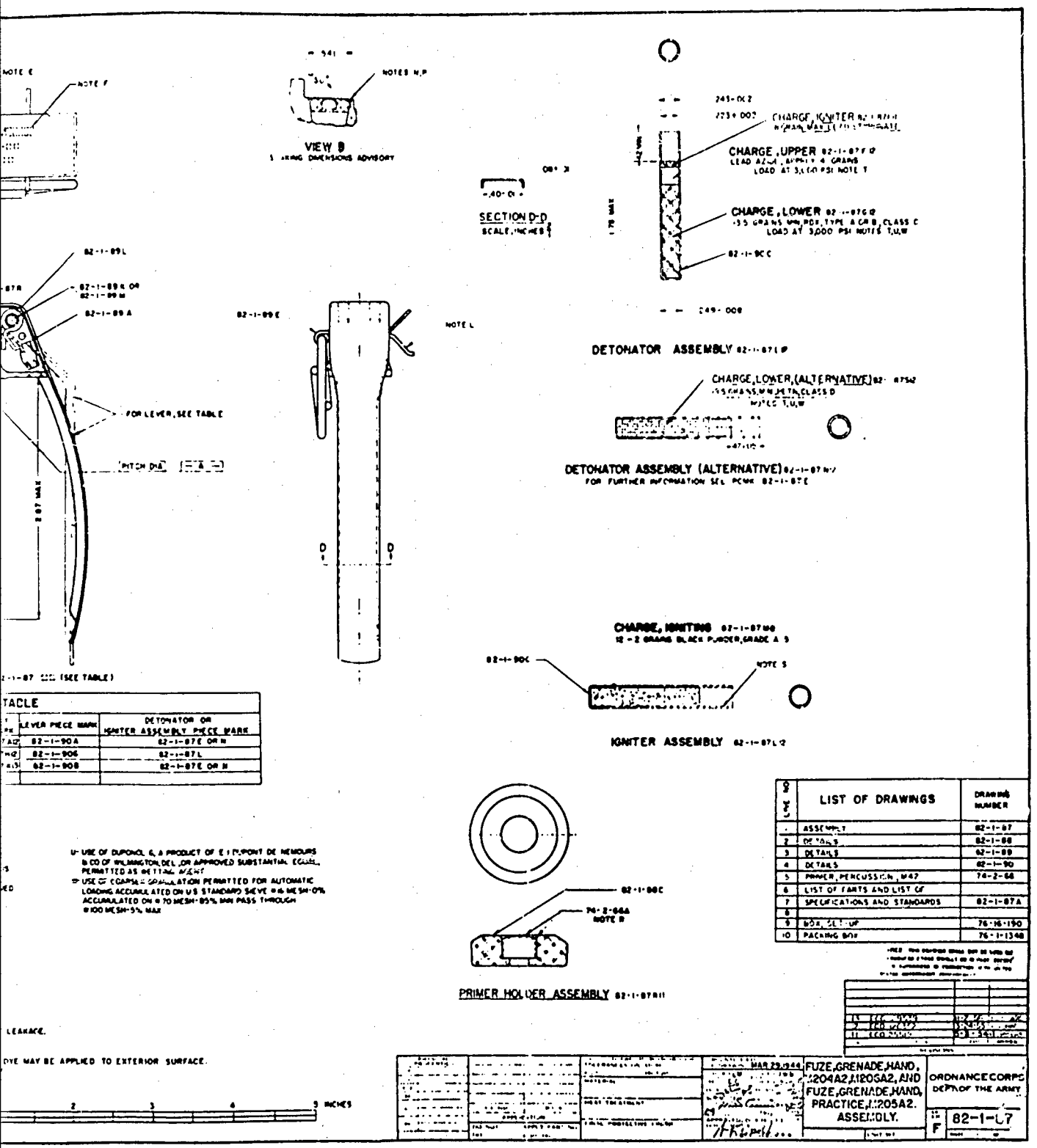

VIEW B
SECTION D-D
SCALE, INCHES
CHARGE, UPPER
CHARGE, LOWER
DETONATOR ASSEMBLY
CHARGE, LOWER, (ALTERNATIVE)
DETONATOR ASSEMBLY (ALTERNATIVE)
CHARGE, IGNITING
IGNITER ASSEMBLY
PRIMER HOLDER ASSEMBLY
LIST OF DRAWINGS
FUZE, GRENADE, HAND, M204A2, M120SA2, AND FUZE, GRENADE, HAND, PRACTICE, M205A2. ASSEMBLY.
ORDNANCE CORPS DEPT OF THE ARMY
82-1-87

Figure 2

TABLE OF DISTRIBUTION

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	Copy Number
1. Commanding Officer Picatinny Arsenal Dover, New Jersey	
ATTN: ORDBB-DB1	1-5
ORDBB-DC2	6-10
ORDBB-DR2	11-15
ORDBB-DR4	16-30
ORDBB-VS3	31-35
ORDBB-DX1	36-37
2. Commanding General Ordnance Special Weapons-Ammunition Command Dover, New Jersey	
ATTN: J. E. Rainier	38-44
T. J. Mahler	45-51
3. Chief of Ordnance Department of the Army Washington 25, D. C.	
ATTN: ORDIM	52-57
4. Armed Services Technical Information Agency Arlington Hall Station Arlington 12, Virginia	58-68
5. Commanding Officer Ordnance Ammunition Command Joliet, Illinois	69-74
6. Commanding Officer Frankford Arsenal Bridge And Tacony Streets Philadelphia 37, Pa.	75-80
7. Commanding Officer Diamond Ordnance Fuze Laboratories Washington 25, D. C.	81-91
8. Office of Technical Services Department of Commerce Washington 25, D. C.	
ATTN: Acquisitions Section	92-97

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Copy Number

9. Liaison Officer
British Joint Services
P. O. Box 680
Benjamin Franklin Station
Washington, D. C. 98-100

VIA:
Chief of Ordnance
Department of the Army
Washington 25, D. C.
ATTN: ORDGU-SE

ABSTRACT DATA

ABSTRACT

AD_____ Accession No._____

Picatinny Arsenal, Ammunition Group
Dover, New Jersey

EVALUATION OF STORAGE CHARACTERISTICS OF PA-101 AND PA-101D, PRIMER COMPOSITIONS.

William F. McGarry and Edmund P. Vail

Technical Report DR-TR: 4-61, July 1961, 13 pp, drawings, appendices.
Unclassified report

The two primer compositions proved to have low impulse and gas volume values. These characteristics make them suitable for use as initiating elements in obturated systems.

Surveillance tests demonstrated that the two compositions showed little difference, with the exception that the dichromated composition (PA-101D) proved easier to load because it flowed more freely than the plain composition.

UNCLASSIFIED

1. Primer compositions.

1. McGarry, William F.
II. Vail, Edmund P.
III. Project 252. 9501. 2600. 311.

UNITERMS

PA-101
PA-101D
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Composition
Lead styphnate
Barium nitrate
Antimony sulfide
Tetracene
Aluminum
Delay
Initiate
Obturation
Impulse
Gas
Volume
Surveillance
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Vail, Edmund P.
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